



Great Falls Trade Area Energy Market Assessment

Efficient, Healthy Buildings

October 2024

About RMI

RMI is an independent, nonprofit organization of experts accelerating the clean energy transition. Driven by deep analytics, we aim to transform the energy system to support prosperous and healthy communities for all.



Meet the RMI Team



Aaron Brickman
Principal



Eva Rosenbloom
Manager



Lachlan Carey
Manager



Madeline Weir
Senior Associate

Contributing Subject Matter Experts



Tyler Farrell
Senior Associate
Transmission



Corey Stewart
Senior Associate
Hydrogen & eFuels

Agenda

- **Project Overview & Key Takeaways**
- **Energy Efficient Buildings**
 - Current Conditions
 - Opportunities for Improvement
 - Understanding the Costs
 - Solution Pathways
 - Next Steps

Project Overview & Goals

WHAT

Energy Market Assessment



Transmission



Buildings



Hydrogen &
eFuels



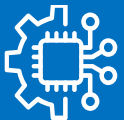
Industry

WHO

RMI, GFDA, + 30 local stakeholders



Government



Innovators



Financial
Institutions



Data
Analysts



Education
& Capacity
Building



Local
Businesses

WHY

Enhance Regional Competitiveness

- To **determine market demand** for increased renewable energy production
- To **understand energy service business needs** including energy efficiency retrofits, wind and solar
- Providing basis for GFDA to **develop a strategy** to implement over the next 3-5 years to attract investment in our trade area.

Project Key Takeaways

Competitiveness



The Great Falls trade area, and Montana at large, has historically benefitted from **fossil fuels**. And is **generally underprepared** to capitalize on the transition to clean energy.



The region's existing natural resource and economic assets point towards **wind, eFuels, and green buildings as competitive opportunities** going forward.

Constraints



Lack of **transmission** and unstable **electricity prices**.



Slow population growth, **limited workforce availability and retention**, and lack of community buy-in.



Minimal access to **cheap, clean power**.



Lack of related existing industries.

Coordination

Transmission: Increased capacity will lead to economic development opportunities.

Hydrogen & eFuels: Great Falls already has a foothold in the SAF market; it's time to build out the local supply chain.

Buildings: Need to connect homeowners and developers to federal funding and close information gaps and capacity constraints.



Energy Efficient Buildings Improve Lives

How?

- Reduce energy bills
- Increase property value
- Provide healthy indoor environments
- Reduced emissions

90%

of our lives are
spent inside
buildings

21%

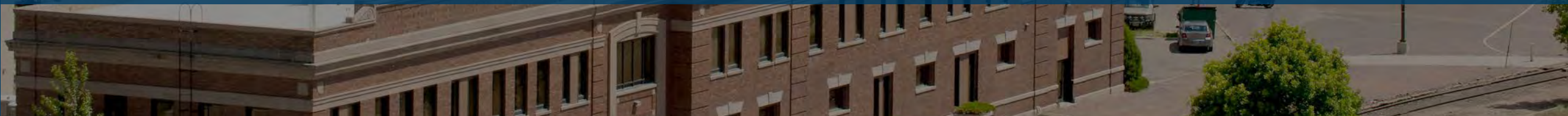
of MT
households face
high energy
burden

58%

of low-income MT
households spend
more than 6% of
income on energy

2x

More exposure to
appliance pollution
for low-income
communities
across US



Stakeholders see opportunities with energy efficient buildings.

"Power resilience for residents is essential – energy efficiency retrofits could help."

– City Official

"Energy bill savings for Montanans – dual fuels approach to pressing peak demand concerns."

– State staffer

"Housing stock is a challenge – lack of worker housing"

– County Official

"Energy efficient building practices are implemented when federal and state funding is involved."

– Construction engineer

"Educating clients on a long-term benefits can overcome resistance to new technologies."

– Construction engineer

"Old housing stock – upgrades needed for structural and electric improvements."

– Local developer

Stakeholders understand challenges to energy efficient buildings.

"State Energy Office has limited access to utility data; measured versus modeled data issues."

– State staffer

"There's been a '*backslide*' away from energy efficient building for larger projects due to costs and long-term maintenance concerns."

– Construction engineer

"Opportunities exist in solar energy tax credits, but scaling up businesses and demand is challenging."

– Local developer

"Taxable value of homes is leading to widespread concern for residents."

– City Official

Stakeholders desire workforce support for energy efficient construction.

"Workforce is retiring – it's difficult to transfer knowledge and develop base skills."

– Construction engineer

"All of the workforce and economic development parts need support – technical training, business support."

– State staffer

"Would like to see quality of jobs enhanced."

– City official

"There is only one energy auditor in all of Montana – there's a need for more."

– State staffer

Opportunities for building upgrades are emerging! But challenges stand in the way.

OPPORTUNITIES

- **IRA funding** for retrofits & high-performance new construction.
- **Good jobs** through workforce training in specific trades.
- **Demand creation potential** through public education and incentive program promotion.
- **Developing companies and industry.**

CHALLENGES

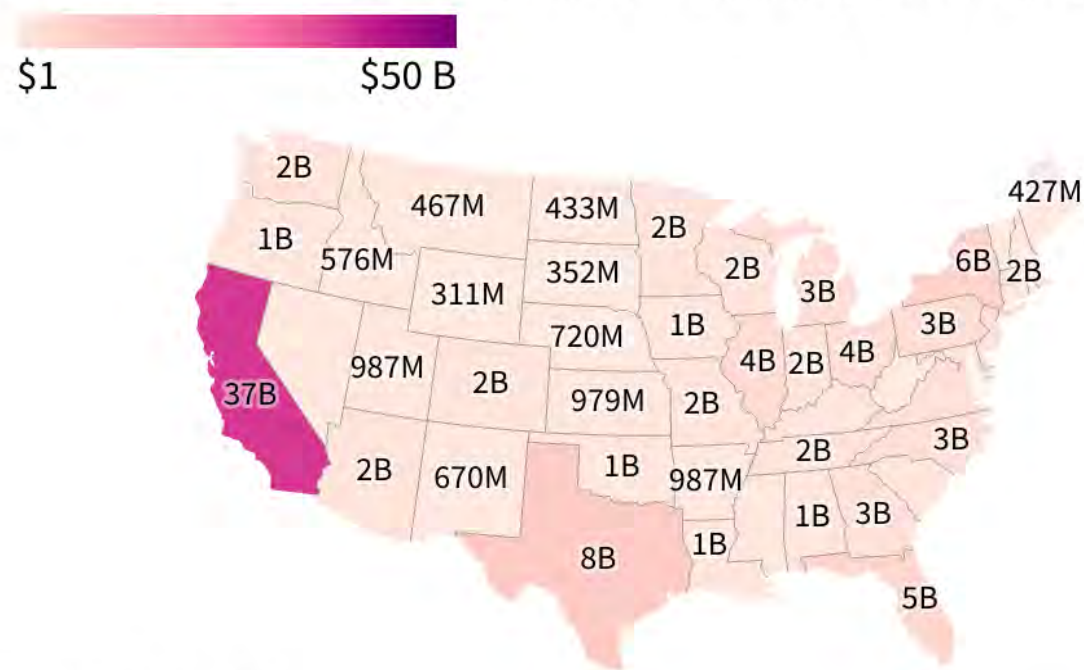
- **Demand isn't driving industry growth.**
 - Upfront costs perceived as prohibitive.
 - Questions about technology.
 - Public isn't bought into benefits.
- **Lack of private sector.**
 - One energy auditor in MT.
 - Contractors talk people out of certain technologies.
- **Incentive programs are not yet accessible/promoted.**
 - Lobbying against solar tax credits.
 - Gap funding is still an issue.

Inflation Reduction Act Opportunities

The IRA is a game-changer for buildings.

\$121B across the US; \$467M for projects in MT

According to RMI's Full Potential scenario, the contiguous U.S. can receive \$121 Billion in IRA funding for buildings sector projects.



Source: RMI Analysis



Consumer rebates are coming in 2025.

MT Can Receive \$71M across these programs; MT DEQ will develop and administer



Image: The White House

Home Electrification and Appliance Rebates Program (Previously HEEHR)

- \$35M allocated to MT through FY2031
 - **Point of sale rebate** program for electrification equipment and efficiency improvements
 - New construction and retrofits

Home Efficiency Rebates Program (Previously HOMES)

- \$35M through FY2031
 - **Savings-based retrofit program** with Measured and Modeled pathways
 - Designed for comprehensive energy efficiency upgrades in larger multifamily buildings and mobile homes
 - Equipment must be ENERGY STAR
 - Rebates double for low-income households
 - Rebates distributed 1-2 months post-retrofit

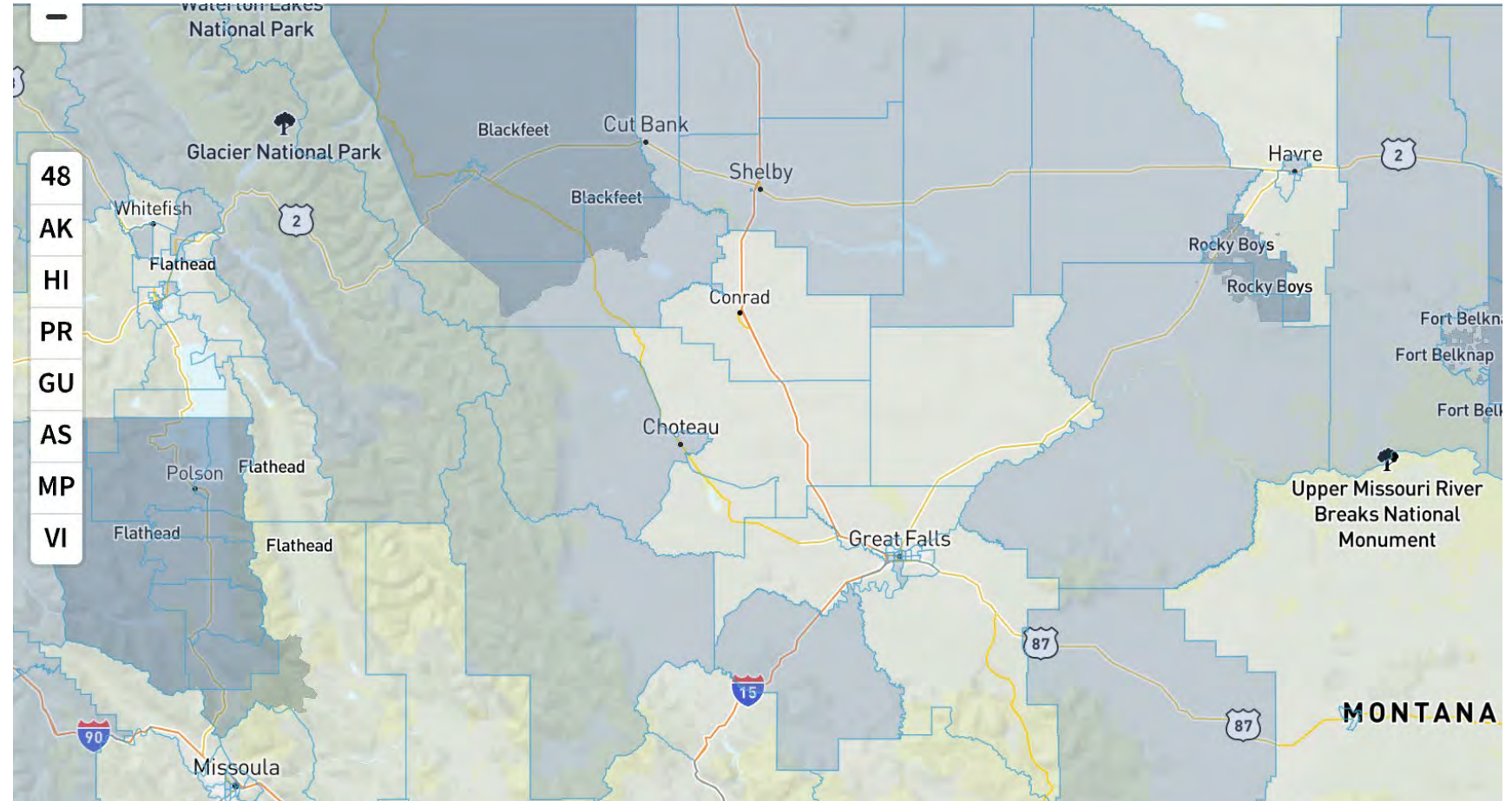
The Greenhouse Gas Reduction Fund (GGRF) is a \$27B investment.

	National Clean Investment Fund (NCIF)	Clean Communities Investment Accelerator (CCIA)	Solar for All
Funding Amount:	\$14B	\$6B	\$7B total; \$43.7M for MT
Awardees:	3 national nonprofit financing organizations; Distributing funding to partners	5 hub nonprofits; OFN and Inclusiv will be key partners	Bonneville; 60* local, state, and tribal governments, and eligible nonprofits
Awardee Activities:	Provide financing for individual households, businesses, community lenders, governments, and other organizations deploying a qualified projects.	Provide community lender capitalization and technical assistance for financing qualified projects in low-income and disadvantaged communities.	Create and maintain, or expand on existing, solar-financing programs for their constituents. Focus on high-quality jobs.
LIDAC Allocation: (Low-income and Disadvantaged Community)	At least 40%	100%	100%
Fund Uses:	- Financial assistance - Market-building activities - Pre-development - Program administration	- Capitalization funding - Technical assistance sub-awards and services - Program administration	- Financial assistance - Project deployment technical assistance - Program administration

Much of the Great Falls area is considered LIDAC.

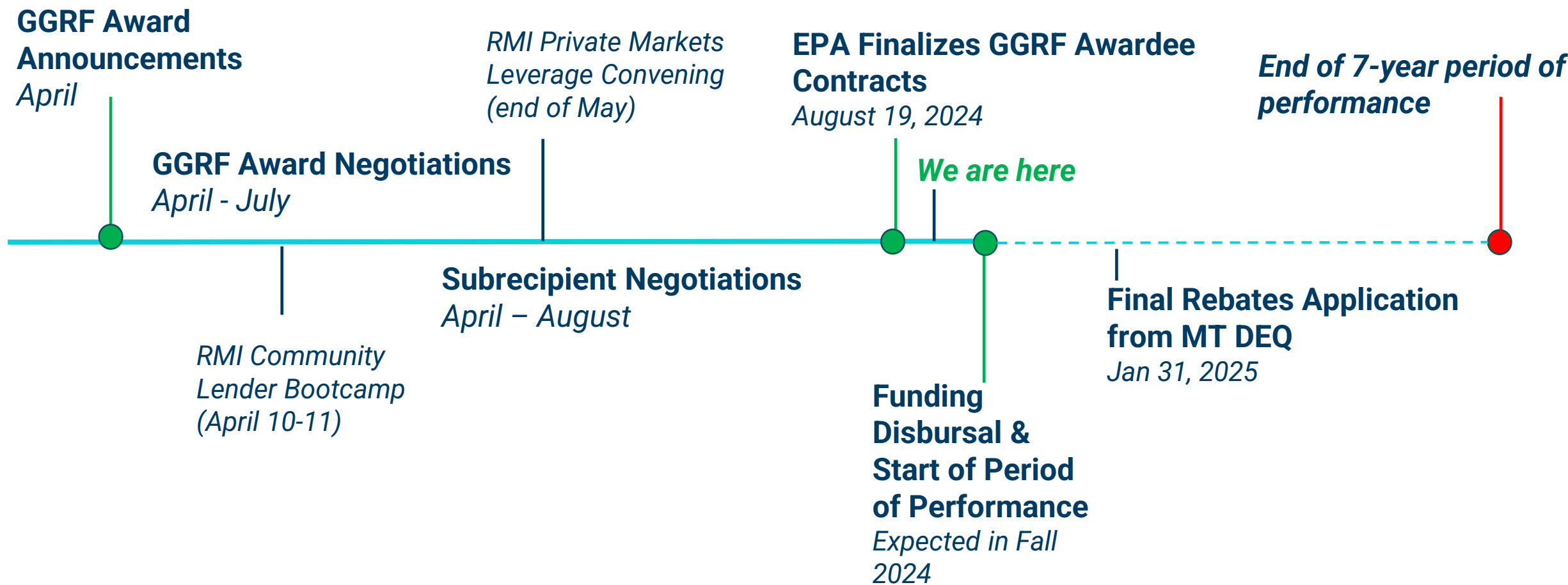
Energy, health, housing, transportation, water, workforce, climate burdens are considered.

Communities that are disadvantaged live in tracts that experience burdens. These tracts are highlighted  on the map.



Funding disbursal and performance period kick off is weeks away.

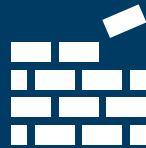
MT is in the application phase for rebate funding and working to secure GGRF funding.



Energy efficient buildings encompass interconnected industry and action.



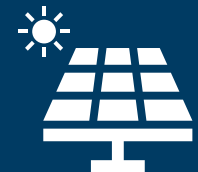
Existing Buildings



New Developments



Industry & Workforce

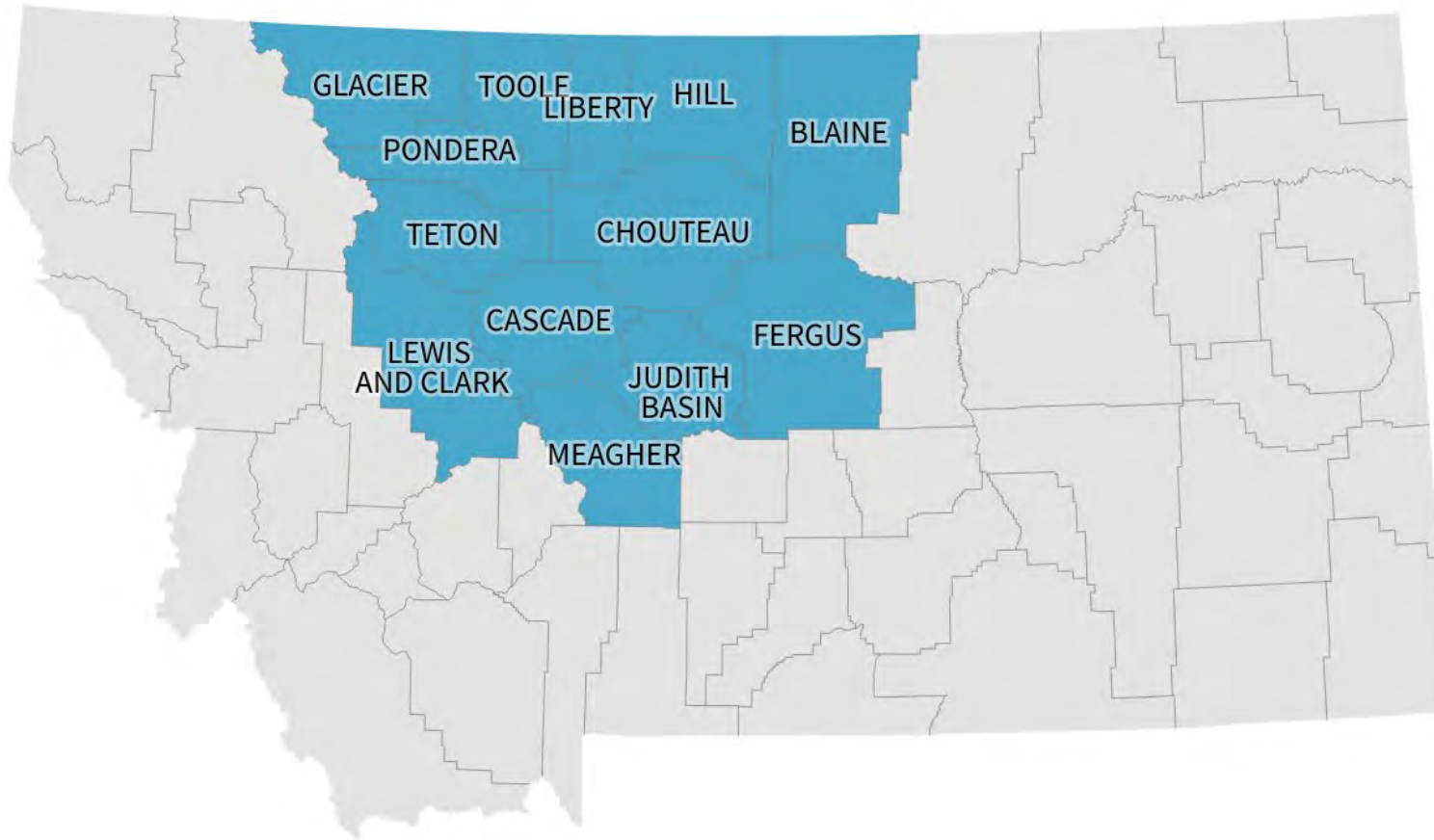


Rooftop Solar



Great Falls Trade Area

13 Counties Included in Regional Study



Total Population: 235,860

- **<18 years old:** 54,366
- **18-64:** 136,558
- **65+:** 44,936

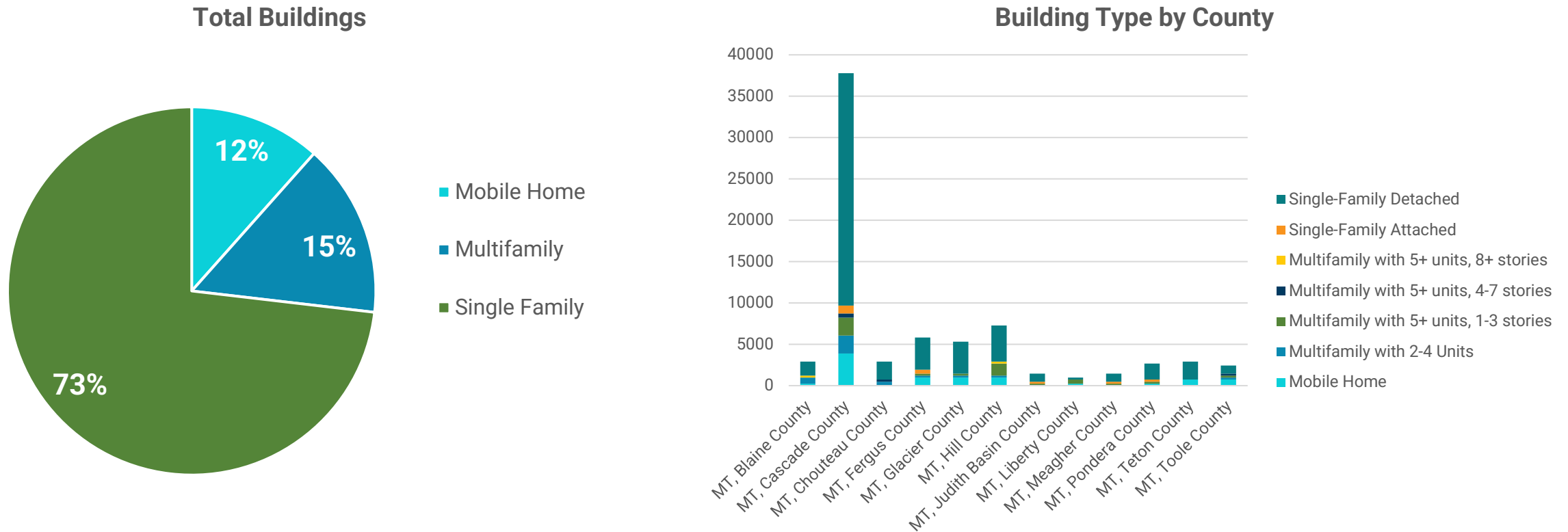
**Ave regional population growth rate
(2012-2022):** 1.07%

Climate zone: 6B (cold, dry, seasonal)

104,000 Residential Buildings
1,660 Commercial Buildings

Existing housing is mostly single-family in a few counties.

73% single family, 15% multifamily | Cascade is a focus county.

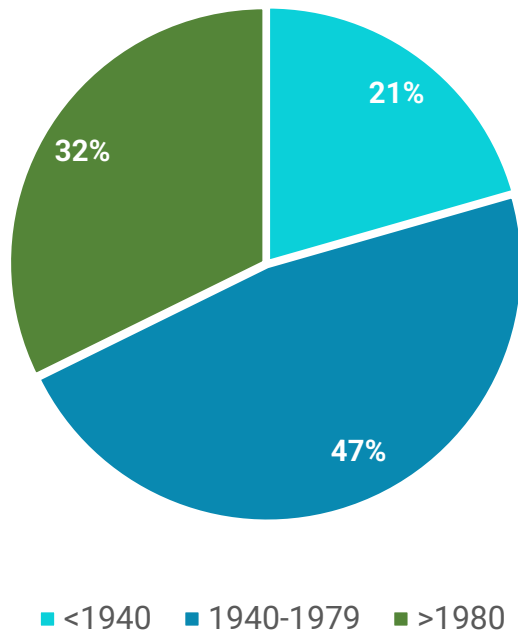


Source: <https://resstock.nrel.gov/page/typology>

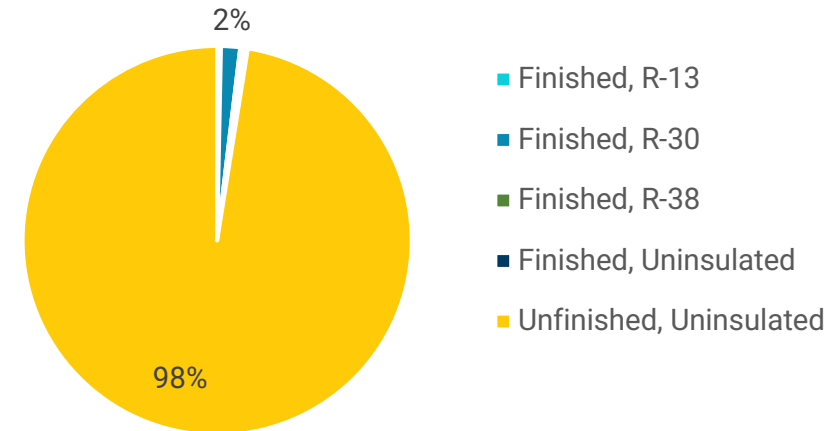
Note: This characterization study utilizes NREL's Restock Typology dataset, which is currently the best dataset available at the National level that looks at multiple data sources. However, there are still limitation on the dataset and the team encourages more locally focused surveys to confirm data.

Single family housing is aging and needs better insulation.

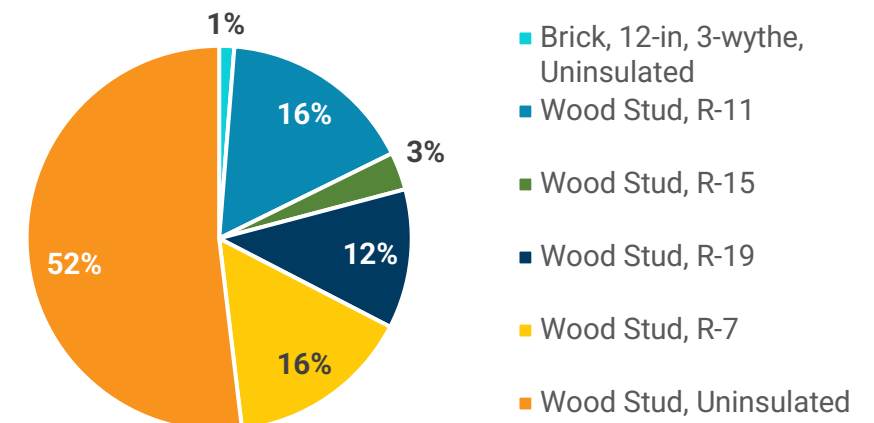
Single Family Vintage



Single Family Roof Insulation



Single Family Wall Insulation



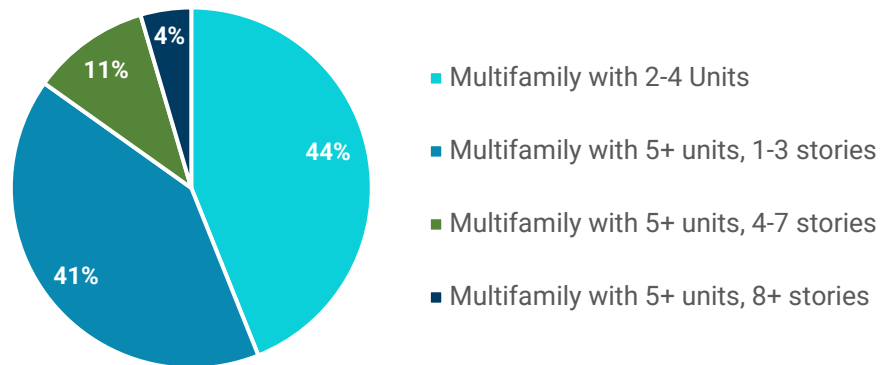
Source: <https://resstock.nrel.gov/page/typology>

Of about 16k multifamily buildings, most are 5+ units.

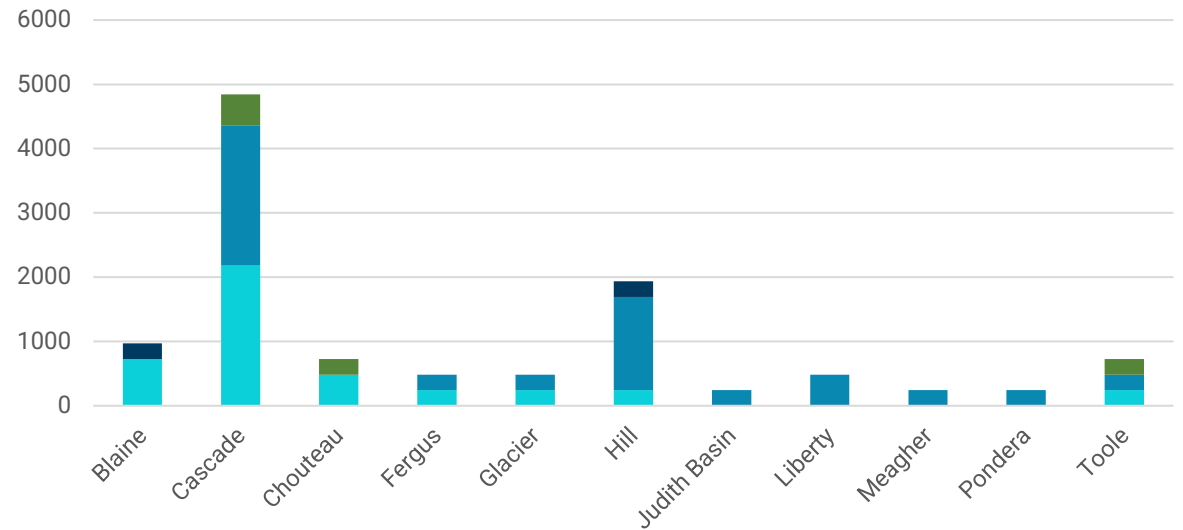
44% are 2-4 units.

Approximately 56% are 5+ units. These are a mix of low- and mid- rise.

Multifamily Building Types



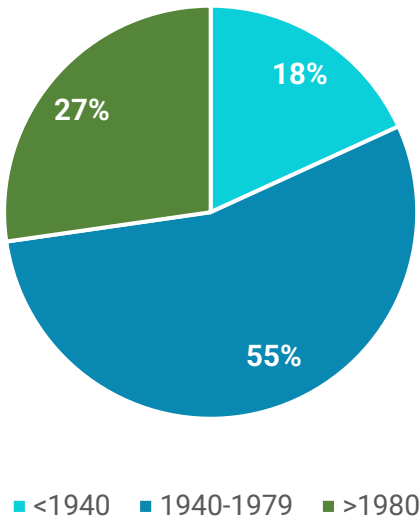
Multifamily Housing By County



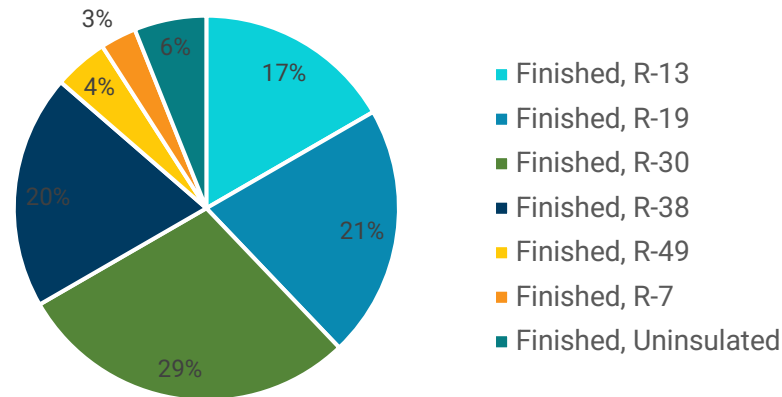
Source: <https://resstock.nrel.gov/page/typology>

Multifamily is older than SF, but slightly better insulated.

Multifamily Vintage



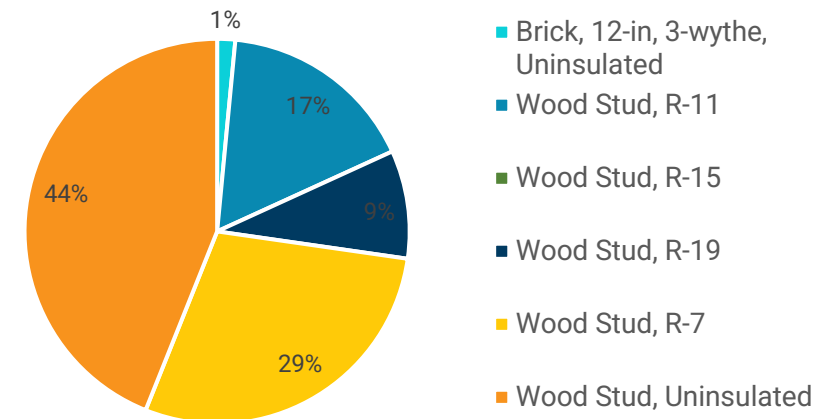
Multifamily Roof Insulation



Climate Zone 6B IECC 2021:

- **Ceiling/Roof Insulation:**
 - R-49 (minimum)
- **Wood Frame Wall Insulation**
 - R-20 cavity insulation + R-5 continuous insulation (or R-25 total)

Multifamily Wall Insulation

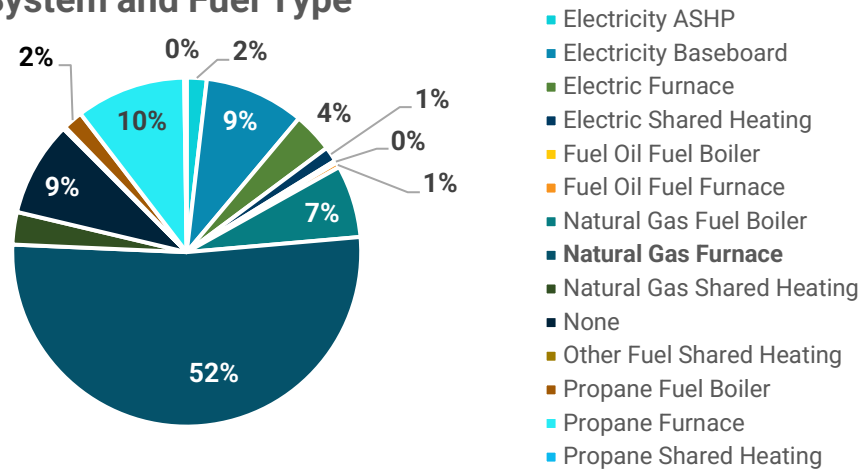


Source: <https://resstock.nrel.gov/page/typology>

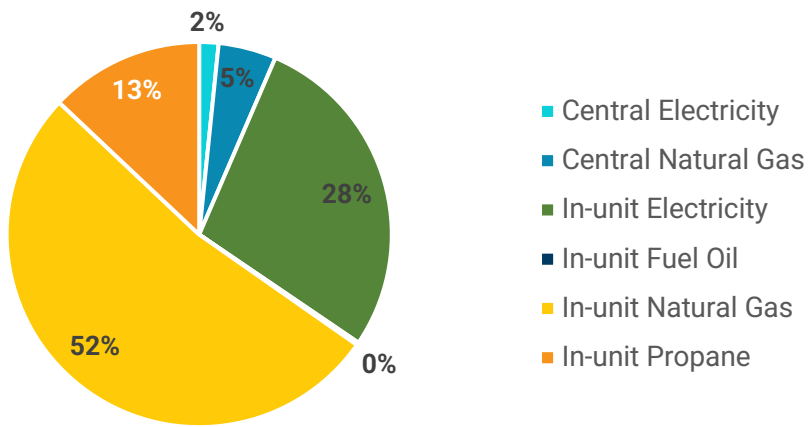
Majority gas powered appliances, except cooking.

Natural gas furnaces + water heating, electric cooking, 26% without AC

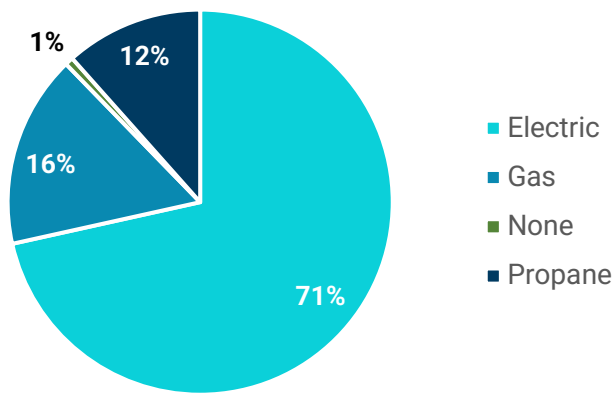
Heating System and Fuel Type



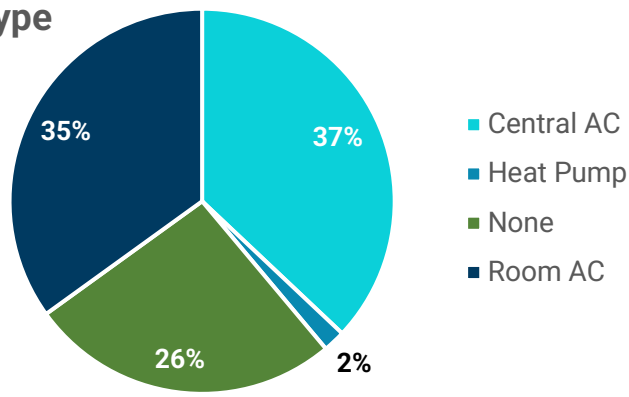
DHW System and Fuel Type



Cooking Fuel

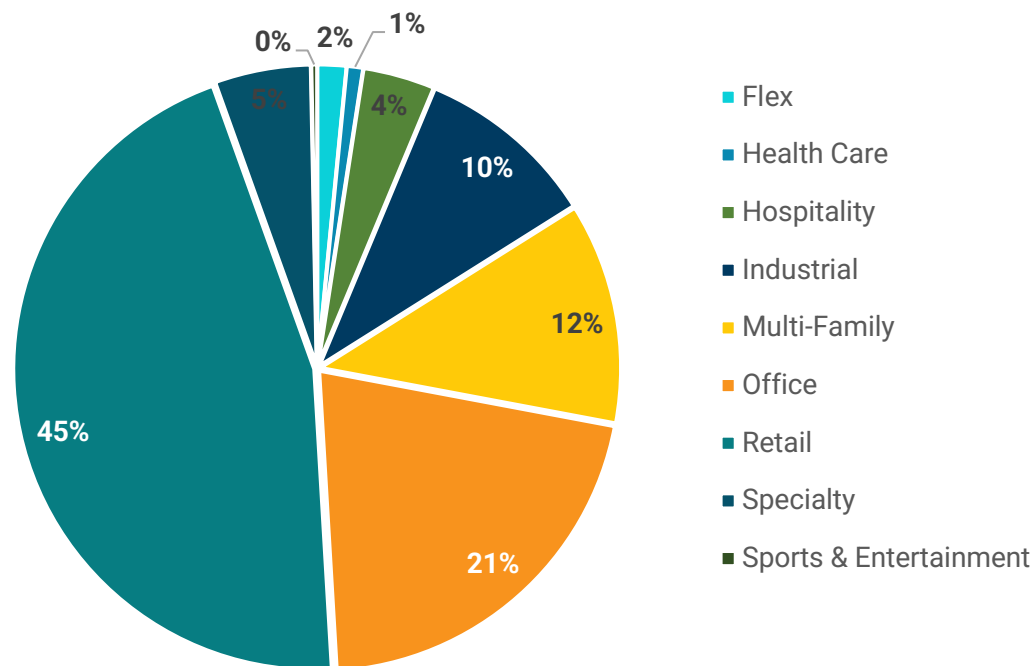


Cooling Type

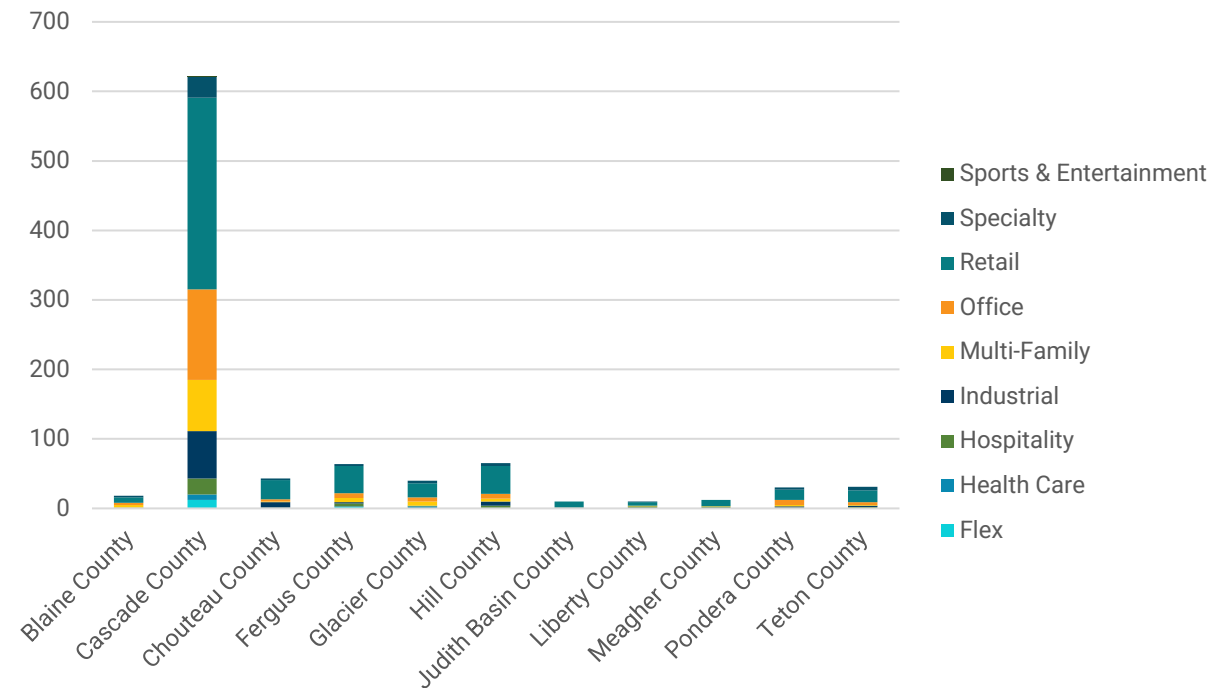


45% is retail | Cascade is priority county

Commercial Buildings by Type

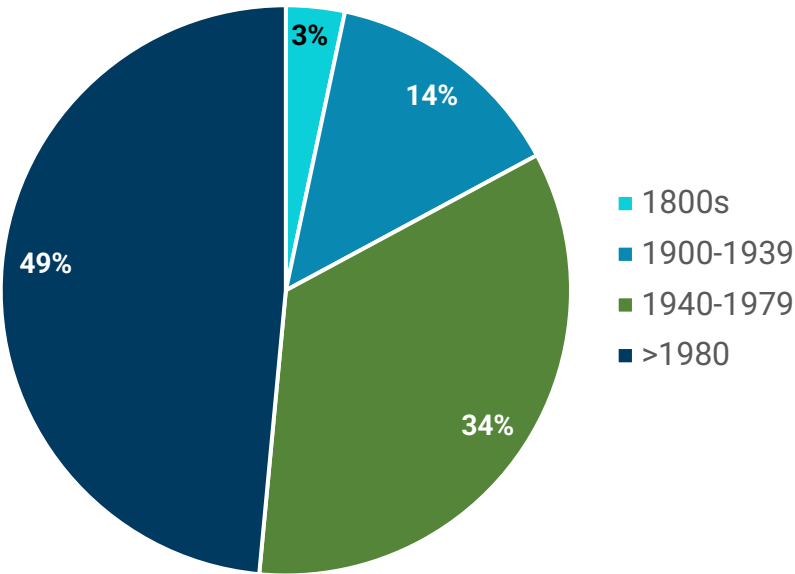


Commercial Building Type by County



Commercial buildings are also aging, meaning poorer energy performance.

Commercial Buildings Vintage



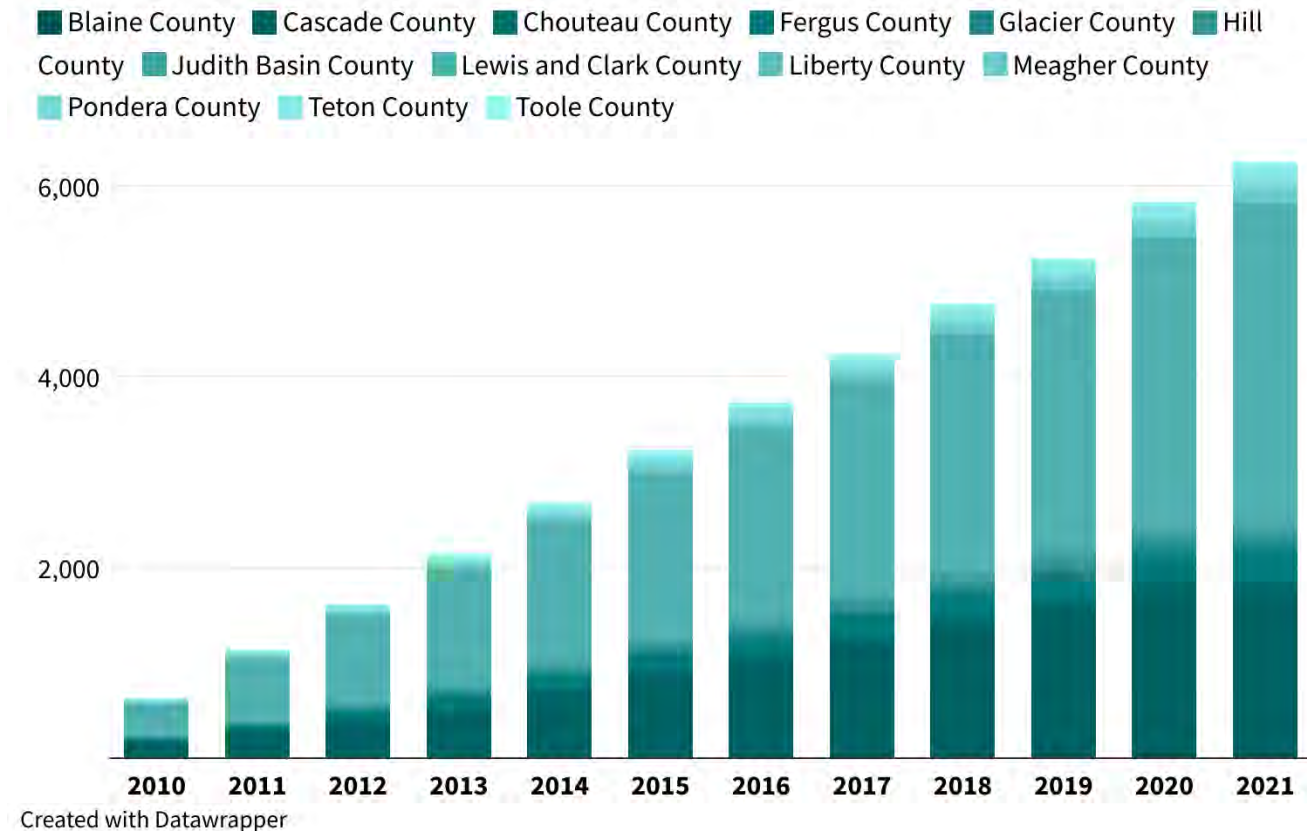
Building Codes 1995 and Now

Building Element	1995 (UBC/ASHRAE 90.1-1989)	IECC 2021
Energy Efficiency Focus	Low priority	High priority (energy optimization and sustainability)
Roof/Ceiling Insulation	R-19 to R-30	R-38 to R-49
Wall Insulation	R-11 to R-13	R-13 to R-20 + continuous insulation
Floor Insulation	Minimal to none in slab-on-grade	R-10 to R-15 at slab edge
Windows (R-value)	R-2 to R-3 (Double-pane, no Low-E)	R-5 to R-7 (Double/triple-pane, Low-E)
Window Frame Material	Aluminum, rarely thermally broken	Thermally broken aluminum or vinyl
HVAC Efficiency	Standard efficiency (SEER 10-12)	High efficiency (SEER 14-18, variable speed)
Lighting	Fluorescent, minimal controls	LED with advanced controls (occupancy sensors)
Air Tightness	Less focus, drafty	Tight construction, blower door testing req'd

Construction of New Homes

- **31%** of single-family homes in MT constructed between 2000-2021.
- Demand for **650 new housing units per year in Great Falls MSA** for the next 10 years.

Over 6,000 new homes have been built in Great Falls since 2009



Supply-Demand

In Great Falls MSA, there's a significant under-supply of housing predicted over next 10 years.

10-Year Demand vs Future Supply: Rental Product



10-Year Demand vs Future Supply: For-Sale Product



Workforce Trends

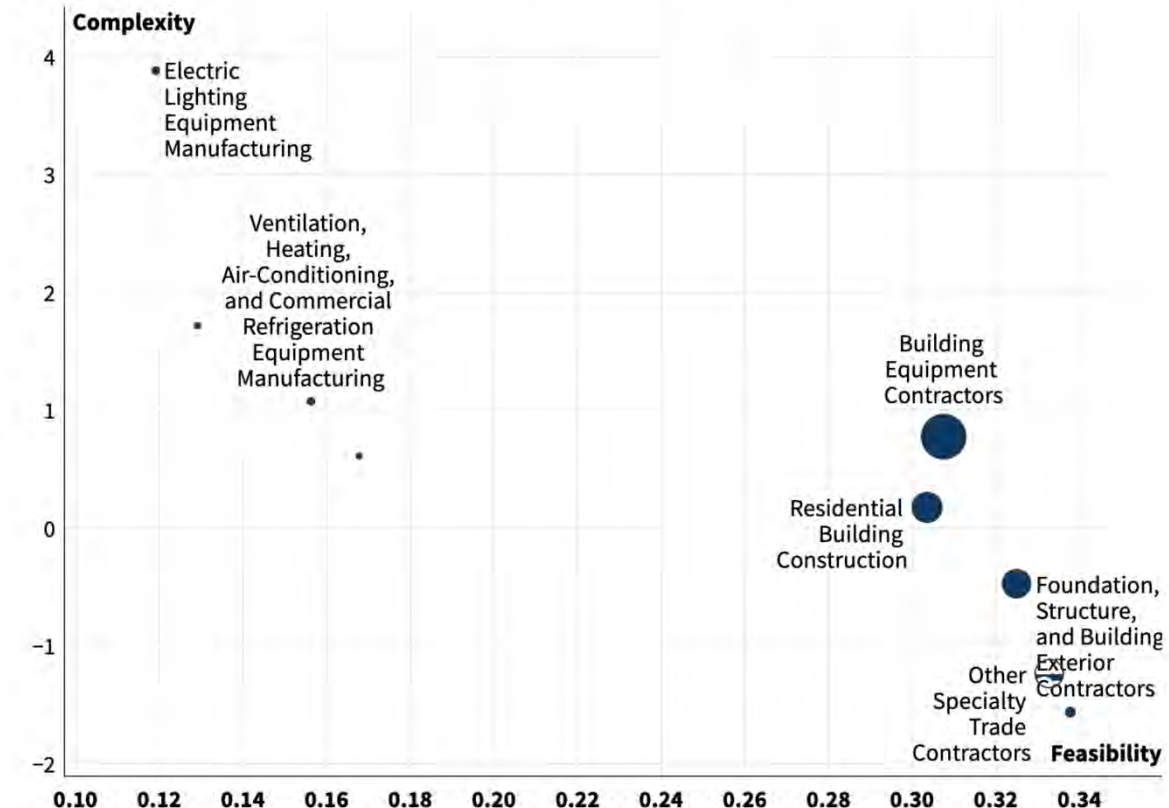
Building equipment contractors & residential construction have high feasibility.

Feasibility means: Existing capacity given industrial base.

Complexity means: The new skills or resources needed to expand.

- Target workforce training for building equipment contractors and residential construction.
- Equipment manufacturing is not an existing industry and requires more skill development.

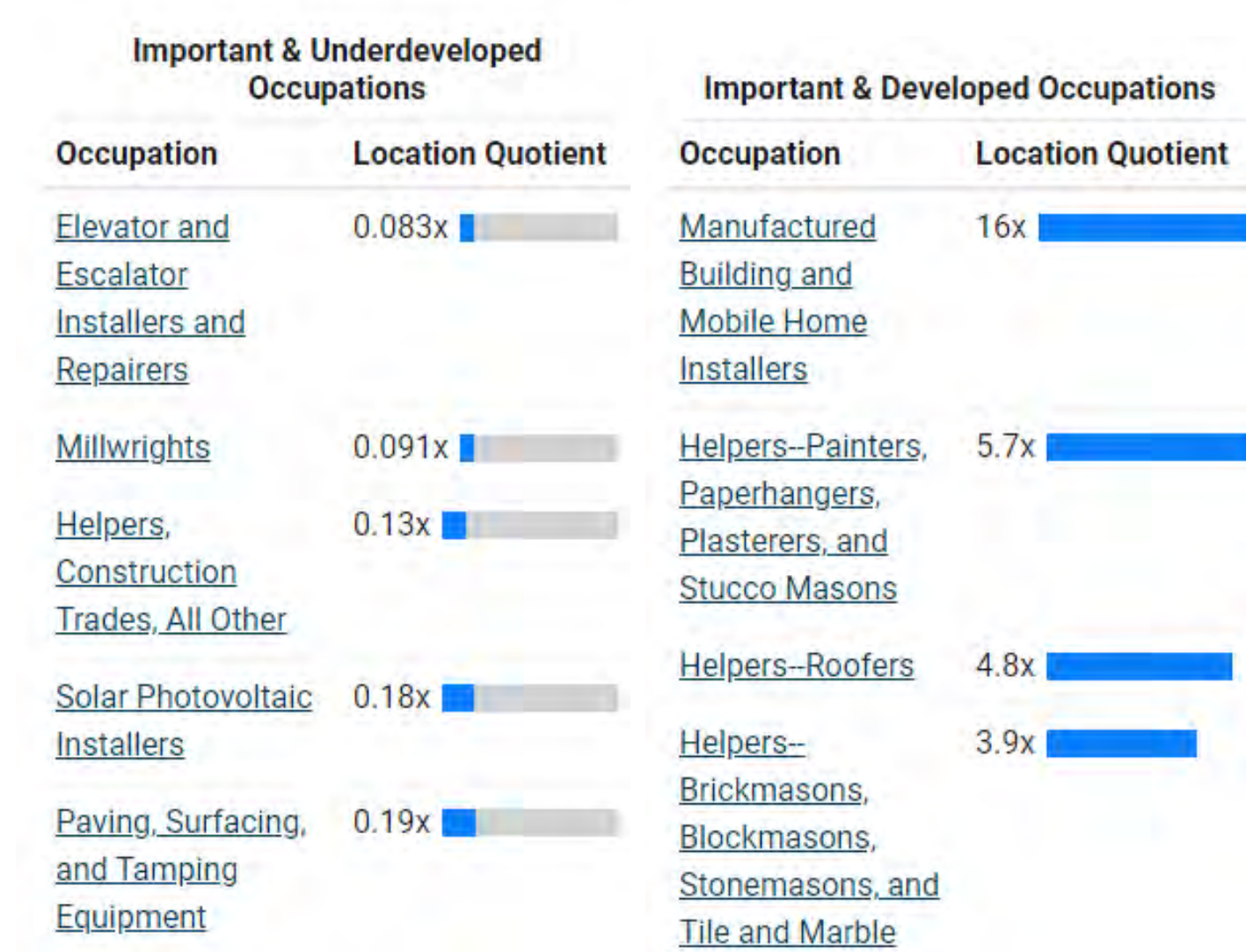
Feasibility and Complexity of Buildings Sector Workforce in Great Falls, MT



Workforce Trends

Via the Clean Growth Tool...

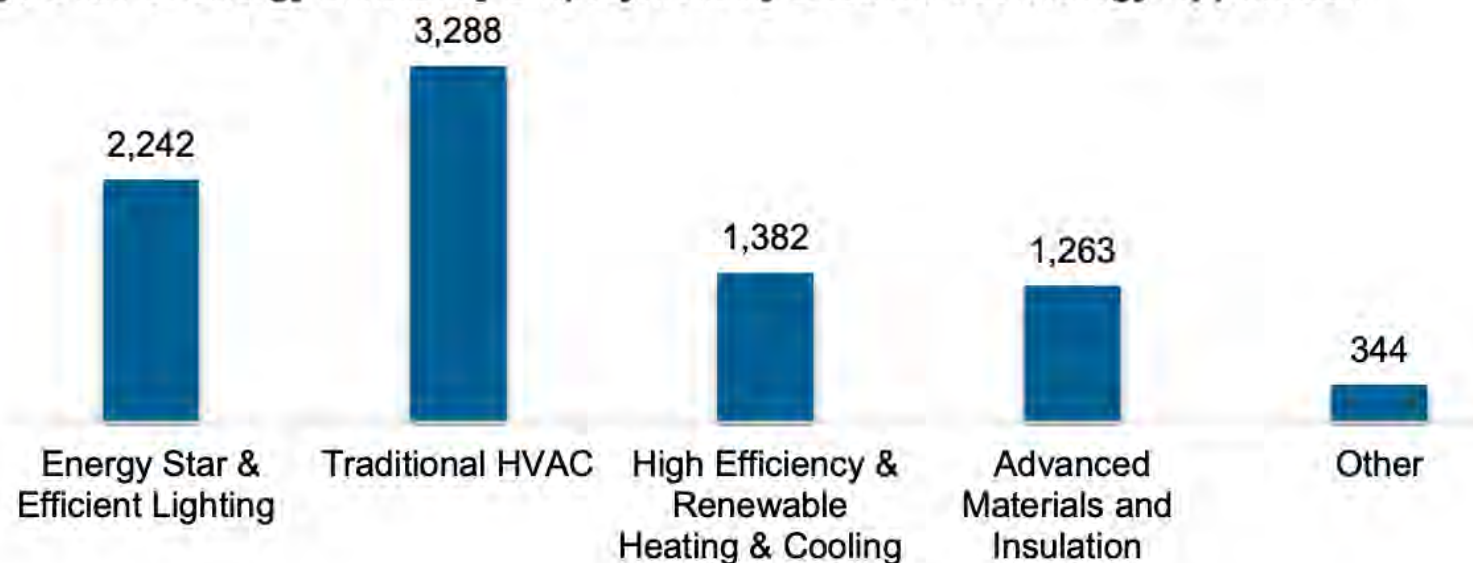
- **96 critical occupations**
- **Opportunity to transition workers.** For example:
 - Roofers to solar installers
 - Painters and brick masons to insulation installers
- **37% of energy efficiency construction jobs are good jobs**
 - Wages above median
 - Healthcare benefits



Workforce Trends

Slow growth in jobs related to energy efficiency, but there are increasing opportunities, nonetheless.

Figure MT-8. Energy Efficiency Employment by Detailed Technology Application



Energy efficiency employment is primarily found in the construction industry (Figure MT-9).

The energy efficiency sector employed 8,518 workers in Montana in 2024:

- EE sector added 234 jobs and increased 2.8% in the past year.

State Solar Breakdown

Montana's solar resource is 26% greater than the national average
BUT currently ranks 41st for total installed solar capacity.

Montana Annual Solar Installations



1,135.45 MW of projected growth by 2028

352 solar jobs (Ranked 48th in 2023)

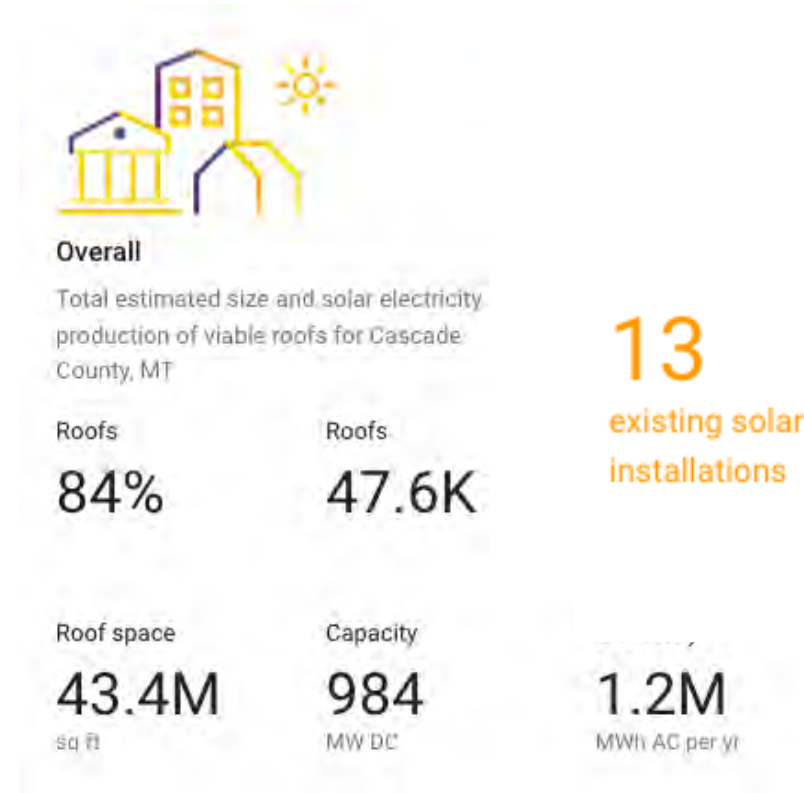
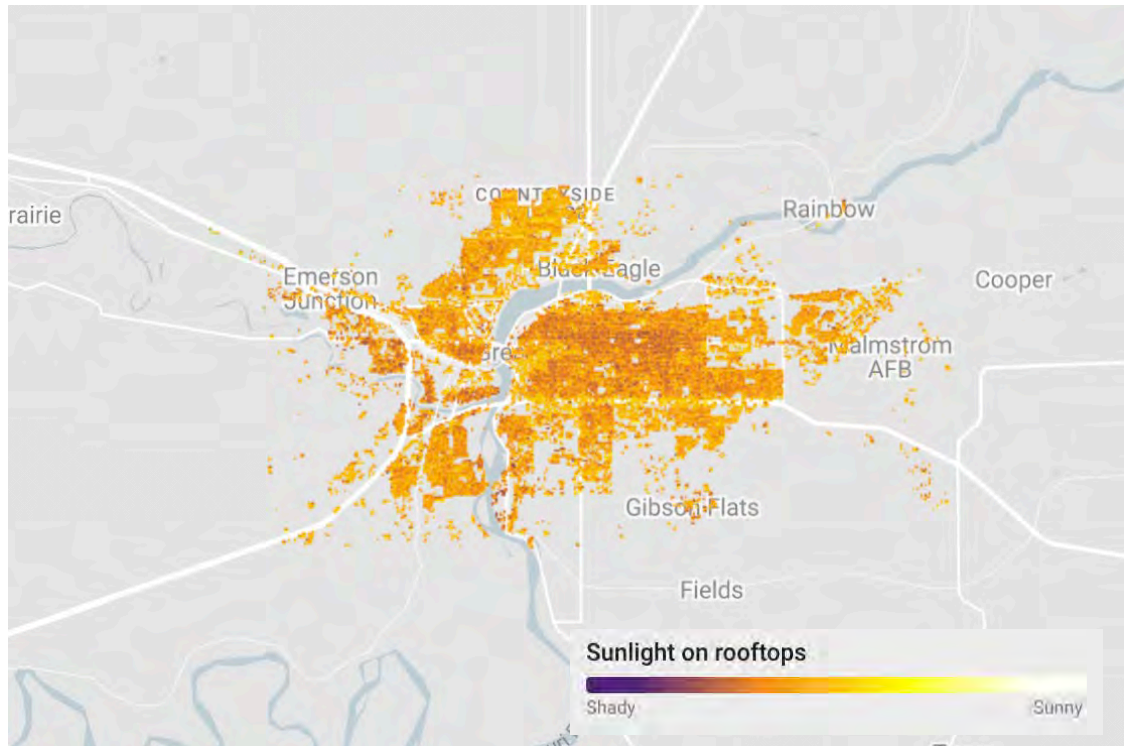
Solar companies in Montana:

- 293 manufacturers
- 21 installers/developers
- 5 other companies

\$452 million market value (\$282 million invested in 2023)

Rooftop Solar in Cascade County

Map of rooftop solar potential; Solar can generate up to 80% of a home's electricity needs.



Rooftop Solar Costs

43% price decline over the last ten years; installing solar panels can cost between \$10,000 - \$30,000 depending on the size of the system and install needs.

Common-system sizes by costs:

System Size	System Cost	System Cost With 30% Federal Solar Tax Credit Applied
6 kW	\$15,240	\$10,688
8 kW	\$20,320	\$14,244
10 kW	\$25,400	\$17,780

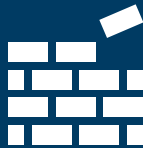
- Great Falls experiences between 158 and 201 sunny days annually.
- Modern solar panels can still generate sufficient power even on cloudy days.
- Net metering in Montana means excess energy produced can be credited to your utility bill.

The energy efficient buildings sector will drive business growth, enable energy savings, and improve homes.



Existing Buildings

Homeowners and renters could save \$1.6M of energy savings per year with high uptake of retrofits.



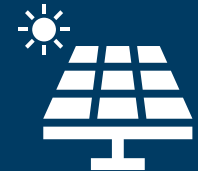
New Developments

Opportunity to build 650+ new, energy efficient homes supported by federal funding.



Industry & Workforce

High uptake could create approximately 19k construction jobs in Montana by 2050.



Rooftop Solar

High uptake of rooftop solar could power 41k homes per year.

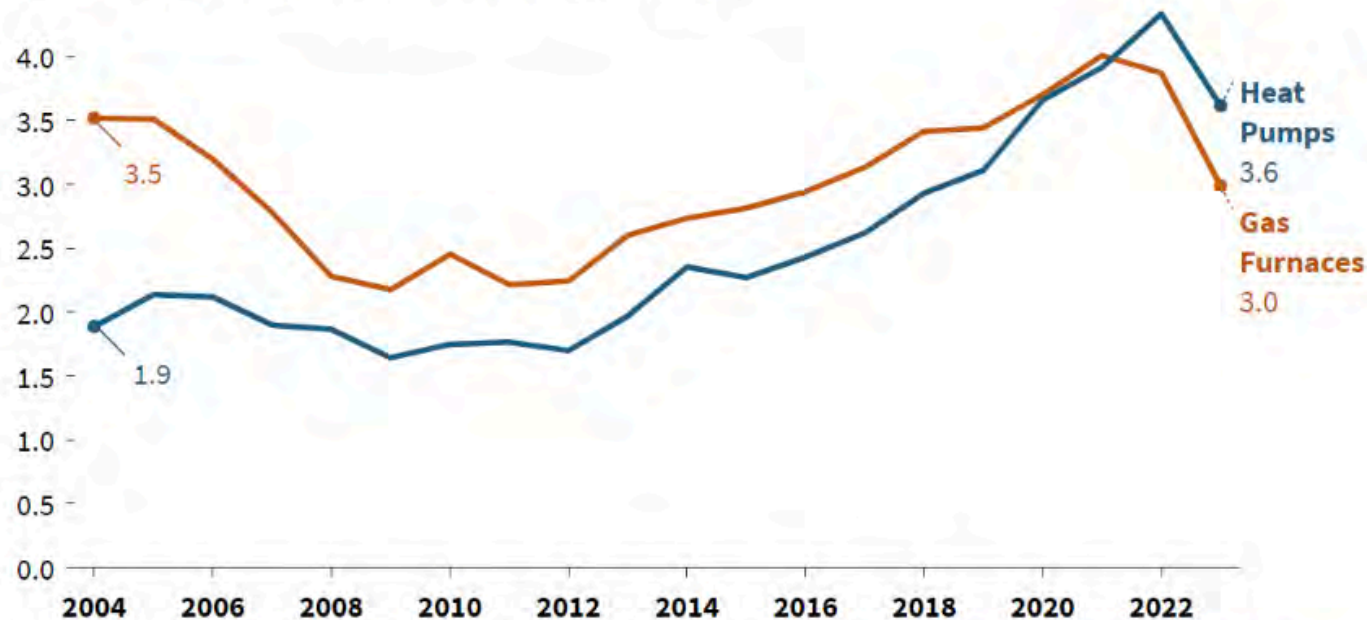
What will help us get there?

Heat pump adoption

Heat pump sales overtook gas furnaces for the first time in 2022, even in cold climates.

Annual Shipments of Gas Furnaces and Central Air-Source Heat Pumps

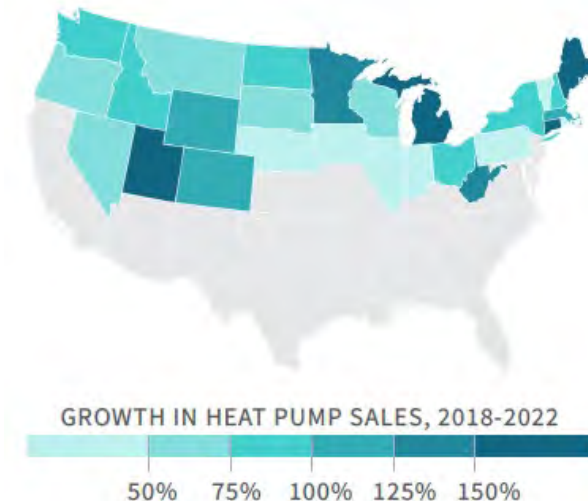
Annual # of units shipped (millions of units), 2004-2023



Source: Air Conditioning, Heating, & Refrigeration Institute, Monthly Shipments Report • [Get the data](#) • [Download image](#)

Many of the coldest states are heat pump leaders.

Cold states are increasingly adopting heat pumps³



Heat Pumps heat and cool 2-4x more efficiently

The average MT single family home can save \$30-170 per year on energy when swapping to HP from gas.

Old



Gas Furnace
+ Air Conditioner

New



Mini-Split
Heat Pump



Ducted Split
Heat Pump



Geothermal
(Ground Source)
Heat Pump



Packaged
Terminal
Heat Pump

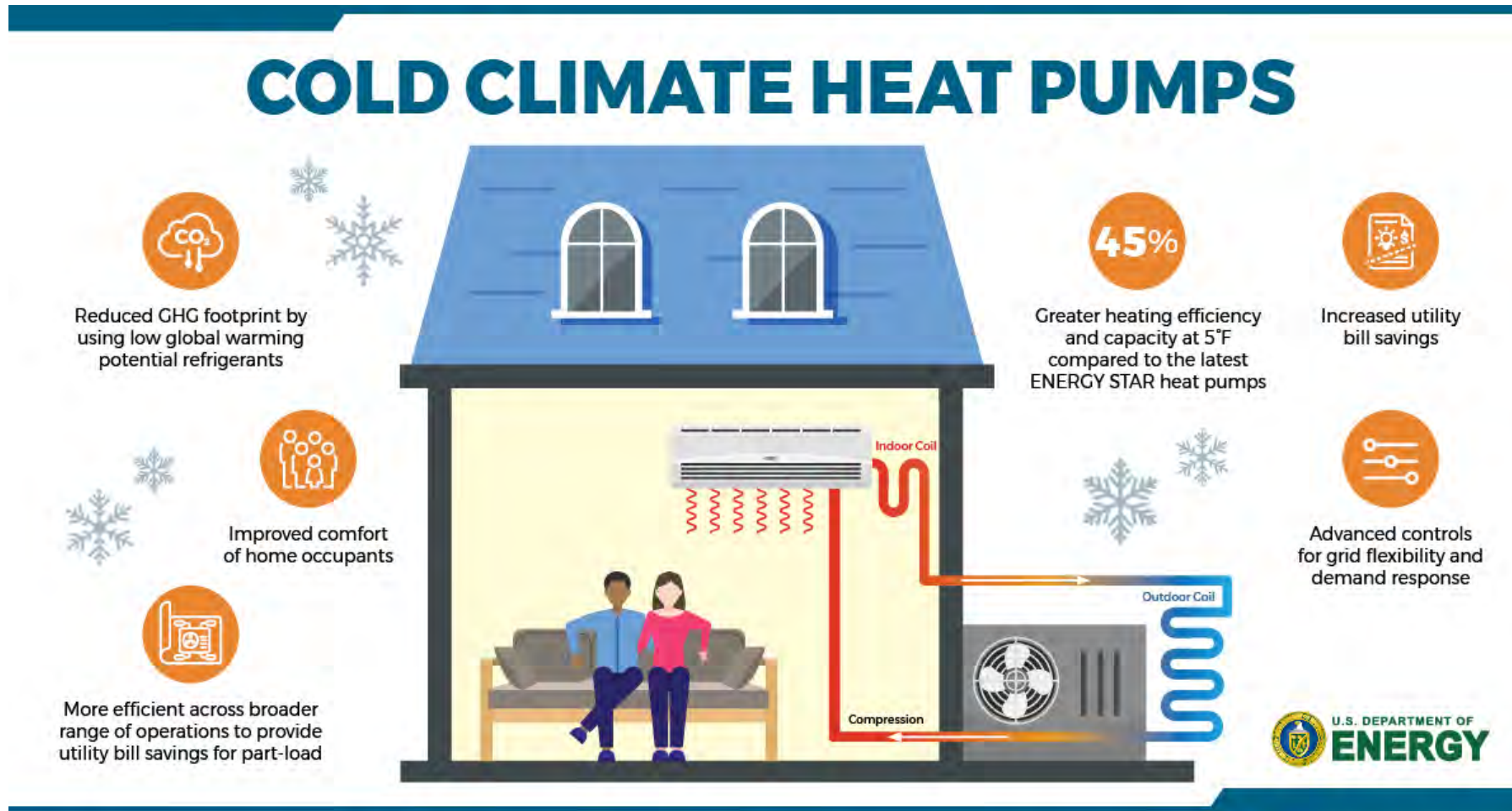


Window and
Thru Wall
Heat Pumps

As compared to gas, oil, or propane systems in Montana's climate - thanks to improved performance in both mild temperatures and extreme cold.

Benefits go beyond savings to improved comfort.

Heat pumps heat, cool, and ventilate.



Heat Pump Water Heaters are 2-3x more efficient

The average MT single family home can save \$250-370 per year on energy when swapping from gas.



2-3x more energy efficient than conventional electric resistance heaters and up to 50% more efficient than a traditional natural gas water heater.

Low-Carbon Building Materials

There are low-cost / no-cost solutions for improving health and sustainability of materials by 19-46% at cost premiums less than 1%

Concrete



Optimize
concrete mix

14%–33% reduction

None to low cost premium

Rebar



Use high recycled
content rebar

4%–10% reduction

None to low cost premium

Insulation



Select low- or
no-embodied-carbon
insulation products

16% reduction

No cost premium

Glazing



Select low-
embodied-carbon
glazing products

3% reduction

10% cost premium

Finish Materials



Select low- or
no-embodied-carb
on finish materials

5% reduction

None to low cost premium

Bio-Based Building Materials



Straw Insulated
Panel



Chopped Straw
Insulation



Engineered Wood
Cladding



Cellulose
insulation



Compressed Straw Panel



Hempwood Flooring



Hemp / lime
panels

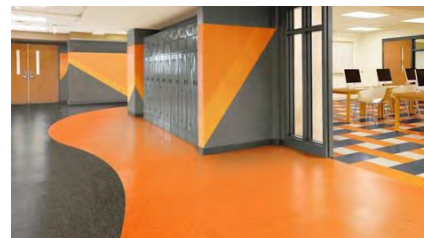


Wood fiber
insulation



Straw board insulation

RMI – Energy. Transformed.



Linoleum flooring



Hemp fiber insulation



Grass insulation

Rooftop Solar Benefits

Resilience

Rooftop solar especially when paired with battery storage **keeps power on during rolling blackouts** and when the grid fails.

Lower Energy Costs Over Time

Producing your own energy and selling excess back to the utility means significantly reduced energy bills.

Protection from Volatile Energy Prices

Shields you from **rising and unpredictable utility prices.**

Increased Home Value

Solar panels increase the appraisal **value of a house by 4.1%** on average.

Note: MT has 100% property and sales tax exemption for 10 years meaning that you won't have to pay add'l property taxes on the increased value due to the solar installation for 10 years.

**How much will it cost?
How do we pay for it?**

How Big is the Green Premium in New Technologies?

Green technologies pay off; Upfront premiums can be offset by incentives and significant long-term savings

Technology/Material	Upfront Cost (w/ Installation)	Traditional Alternative Cost	Green Premium	Incentives	Lifetime Savings	Net Benefit (Lifetime Savings minus Premium)
Heat Pump Water Heater	\$1,500 - \$4,000	\$900 - \$2,300 (Gas Water Heater)	\$600 - \$1,700	Federal tax credit; NWE rebates; MT Alternative Energy Revolving Loan Program	\$2,500 - \$3,500 (10-15 years)	\$800 - \$2,900
Heat Pump	\$6,000 - \$13,000	\$4,500 - \$10,000 (Gas Furnace)	\$1,500 - \$3,000	Federal tax credit; NWE rebates; MT Alternative Energy Revolving Loan Program	\$5,000 - \$10,000 (15-20 years)	\$2,000 - \$9,000
Bio-Based Building Materials	\$2.00 - \$3.50 per sq ft (Installed)	\$1.80 - \$3.00 per sq ft	10% - 20% more expensive	Federal tax incentives for energy-efficient homes (up to \$2,000)	\$1,000 - \$2,000 (10-15 years)	\$500 - \$1,500

What funding is available for homeowners today?

Incentive/Program	Description	Who Can Use It?	Occurrence	Benefits
<u>NorthWestern Energy Residential Rebate Programs</u>	Offers incentives for energy-saving measures like duct sealing, insulation, and energy-efficient appliances.	Residential property owners (existing gas and electric customers).	One-time or as needed based on eligibility.	\$200-\$1,000 (varies by measure) Reduces costs of energy efficiency upgrades such as insulation, air sealing, lighting, appliances, thermostats.
<u>MT Weatherization Assistance Program</u>	Targets low-income households to reduce energy costs through insulation, air sealing, and furnace repairs.	Low-income households in Montana.	One-time or per qualifying project.	Amount varies based on income level. Supports LMI households on energy bills and weatherization improvements.
<u>Energy Efficient Home Improvement Tax Credit (25C)</u>	Provides tax credits for energy-efficient improvements such as windows, doors, and HVAC systems.	Homeowners (principal residence only).	Annual aggregate limit of \$3,200 until 2032.	Provides up to \$3,200 in tax credits for eligible energy efficiency improvements.

What incentives are there for commercial owners?

Incentive/Program	Description	Who Can Use It?	Type	Occurrence	Benefits
NorthWestern Energy Rebates	Offers a variety of efficiency rebates for commercial customers. Custom incentives may be available through the E+ Business Partners program.	Commercial Building Owners	Rebates and Cash Incentives	One-time	Reduces the cost of energy efficiency upgrades through rebates and custom incentives.
Montana C-PACE Financing	Provides financing for energy efficiency upgrades and renewable energy investments, repaid via property tax assessment with terms up to 20 years.	Commercial Property Owners	Financing	Long-term (up to 20 years)	Covers up to 100% of eligible project costs, making energy upgrades more financially feasible.
MT DEQ Alternative Energy Revolving Loan Program	Offers low-interest loans to increase investments in alternative energy systems and energy conservation measures.	Small Businesses, Nonprofits, Government Entities	Financing	Long-term	Provides affordable financing options for energy conservation and renewable energy projects.
Commercial Buildings Energy-Efficiency Tax Deduction (179D)	Allows building owners to claim a tax deduction for installing qualifying energy-efficient systems in commercial buildings.	Commercial Building Owners	Tax Credit	One-time	Reduces federal income tax liability by providing a deduction for energy-efficient building investments.

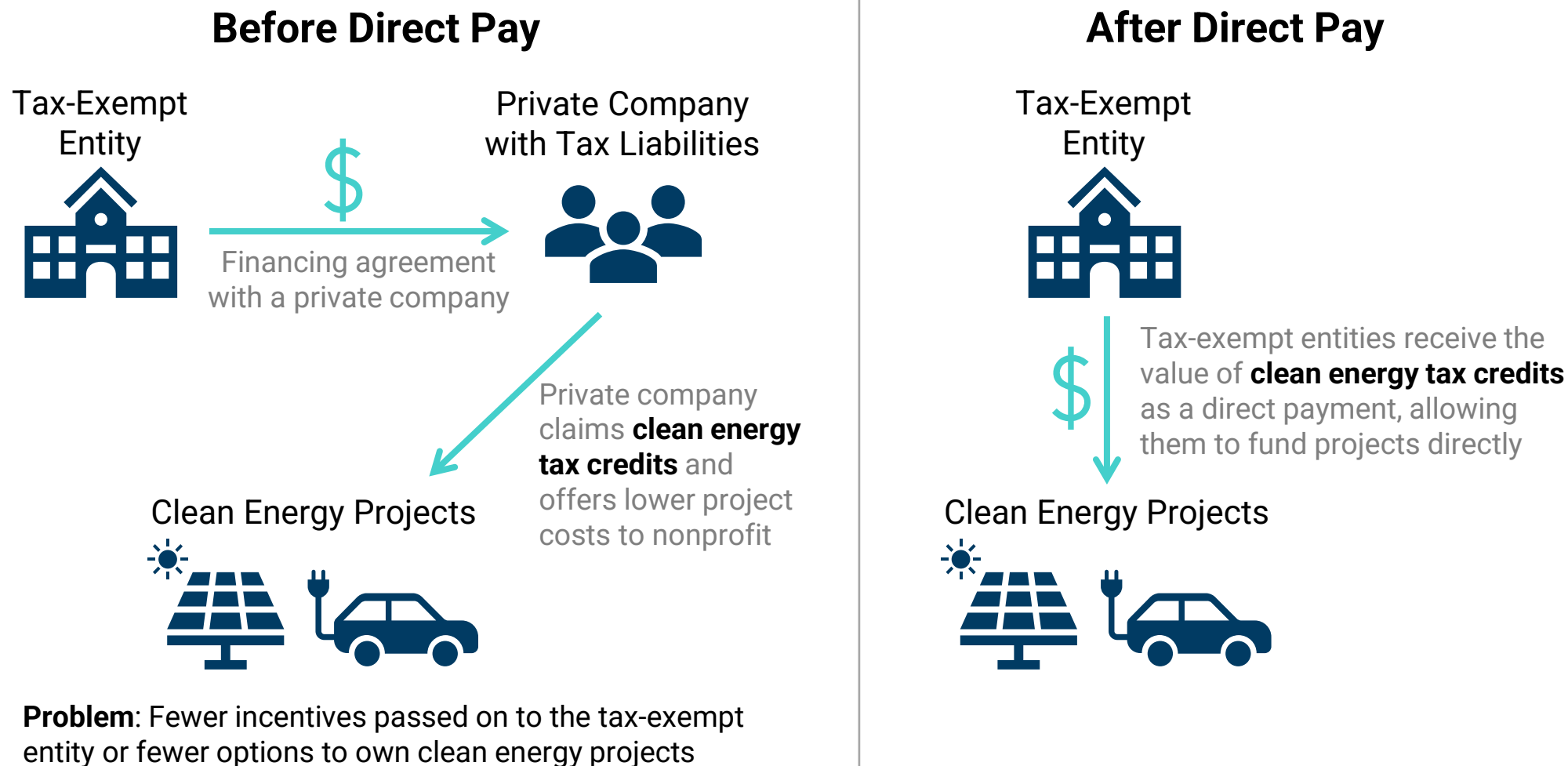
And new funding is on its way.

Incentive/Program	Description	Who Can Use It?	Type	Occurrence	Benefits
MT Residential Energy Efficiency Rebates (IRA Funding)	New funding for whole-house energy savings with tiered rebates based on income (below or above 80% AMI).	Homeowners in Montana, with varying eligibility based on income.	Rebates for energy efficiency improvements	One-time based on project qualification.	Helps homeowners achieve significant energy savings through efficiency improvements.
High-Efficiency Electric Home Rebate Program (HEEHRA)	Provides rebates for home electrification upgrades, including HVAC, heat pumps, and electrical systems for LMI households.	Low- and moderate-income households.	Rebates for electrification upgrades	Ongoing for 10 years.	Reduces costs of home electrification and lowers energy bills for LMI households.
Home Energy Performance-Based Rebates (HOMES Program)	Offers performance-based rebates for home efficiency upgrades based on energy savings achieved.	Homeowners and multifamily building owners.	Performance-based rebates	One-time rebate based on energy performance.	Provides incentives for improving energy performance, leading to long-term savings and efficiency.

There are already incentives for rooftop solar.

Incentive/Program	Description	Who can use/Type	Occurrence	Benefits
Federal Solar Investment Tax Credit (ITC)	Federal income tax credit to deduct 30% of the solar installation cost from their taxes.	Homeowners & businesses/ Nonrefundable tax credit	One-time	Reduces the cost of solar installation by 30%. For an average \$16,000 system, the credit saves around \$4,800.
Alternative Energy Revolving Loan Program (AERLP)	Offers low-interest loans (3.5% fixed for up to 10 years) for solar installations, up to \$40,000.	Homeowners & businesses/ Loan discount	One-time	Helps reduce upfront costs by providing affordable financing options.
Renewable Energy Systems Exemption	Property tax exemption for the added value from solar installations, lasting up to 10 years.	Homeowners & businesses/ Tax exemption	Annually	Prevents property tax increases due to solar installation.
Net Metering	Allows residents to receive credits on their electricity bill for excess energy sent back to the grid.	Homeowners & businesses/ Payment or bill credit	Monthly	Reduces energy costs by crediting surplus energy produced. No cash back, only bill credits in Montana.
NorthWestern Energy E+ Renewable Energy Program	Provides cash incentives to businesses for installing renewable energy systems, including solar.	Businesses & Agricultural Entities: Cash incentive	One-time	Reduces the upfront cost for businesses by offering cash rebates for renewable energy installations.
IRA Direct Pay for Nonprofits	Allows tax-exempt entities to receive direct payments equal to the value of tax credits, such as the ITC, for installing renewable energy.	Tax exempt organizations: Direct payment	One-time	Enables nonprofits to benefit financially from solar installations without needing to owe taxes.

Direct Pay means tax-exempt entities can benefit from clean energy tax credits directly.



What can GFDA do?

GFDA Solution Pathways

Coordination



Business Development Support:

- Staff training and communication of energy efficiency benefits
- Support for energy efficiency and solar companies
- Explore development of low-embodied carbon industry



Program Support:

- Facilitate heat pump water heater program
- Work with Bonneville on rooftop solar program
- Identify and support a whole building retrofit demonstration project



Financial Support:

- Work on funding streams for new energy efficient housing
- Coordinate with Clearwater Credit Union on new financing options for projects
- Potentially provide gap financing for larger commercial and multifamily projects

1) Train on the benefits of energy efficient buildings

Create public buy-in to facilitate demand and boost industry.

Key Steps:

- 1) Train GFDA staff and community using content in presentation plus provided resources.
- 2) Support partners in distributing public-facing resources explaining the financial, environmental, and health benefits of energy efficient buildings.
- 3) Organize workshop to engage residents, developers, and local policymakers.
- 4) Speak with schools and other public entities about integrating energy efficient building concepts into their programs and outreach.

Who:

GFDA, MREA, NeighborWorks, City of Great Falls, County leaders, Other community-based NGOs.

Training Resources:

- Better Buildings Solution Center - Building Science Education
- RMI 101s
 - Embodied Carbon
 - Geothermal Heat Pumps
 - Decarbonization Financing

Example Training & Awareness Programs

Case Study: BayREN

Project Detail: A regional collaborative that represents and serves the Bay Area's nine counties with outreach, training, technical assistance, funding and resources to make the Bay Area and California a more resilient, more equitable and more energy efficient place to live.

Case Study: Virginia Energy Efficiency Council Honors

Project Detail: Energy Efficiency Leadership Awards
Launched in 2016 showcase how energy efficiency champions are helping businesses, governments, homeowners, and schools save money on energy bills, reduce energy consumption, and stimulate job growth and the economy.



2) Offer business support for energy efficiency companies

Capitalize on the opportunity to better insulate and seal Great Falls region homes.

Key Steps:

- 1) Discuss **Energy Efficiency and Conservation Block Grant and TREC funding** with MT DEQ, Cascade County, Lewis and Clark County, and Great Falls for incentives and contractor development.
- 2) **Identify local companies or individuals to support** and create programs with partners for technical assistance, business coaching, demand generation, and workshops.
- 3) **Collaborate with MSU and the working group to recruit and train potential workers** for Weatherization programs, with in-person sessions in Great Falls.
- 4) **Assist city or county in promoting training and coaching** programs through educational campaigns to boost participation.

Who:

GFDA, MT DEQ (funding and workforce support), Montana State University (training), NorthWestern

Local Companies:

- Klinefelter's Insulation
- American Quality Construction
- Therma Shield Insulation
- Dayspring Restoration
- Quality First Insulation
- AT Klemens
- Great Falls Mechanicals
- Gill's Heating and Cooling
- B&B Heating and AC

Example Workforce Training & Biz Dev Programs

Case Study: Michigan Saves Contractor Training

Project Detail: Offers free trainings for contractors who apply to the program. After a contractor completes training, they receive marketing and financing support and are put on an approved contractor list.



Michigan Saves®

Case Study: State TREC Awards

Project Detail: Training for Residential Energy Contractors (TREC) Program provides funding to state energy offices so they can train, test, and certify residential energy efficiency and electrification contractors. States can partner with nonprofit organizations to develop and implement these programs.



3) Offer business support for rooftop solar companies

Capitalize on the opportunity to better insulate and seal Great Falls region homes.

Key Steps:

1. Meet with rooftop solar companies to **identify barriers to business growth** in the region.
2. **Meet with Bonneville** to understand their priorities for Solar for All funding.
3. **Offer technical assistance, business coaching, and financial management training** for rooftop solar businesses.
4. **Connect companies with local financial institutions** and state programs that can provide access to capital.
5. **Work with utilities and local governments to incentivize rooftop solar** installations on both residential and commercial properties.

Who:

GFDA, NorthWestern Energy, Montana Solar Energy Industries Association (MTSEIA), and local banks/financial institution

Local Companies:

- Solarize Montana (community-driven bulk solar purchasing program)

Example Solar Workforce Training & Biz Dev Program

Case Study: SEIA Solar 101 & Apprenticeships



Project Detail: The Solar 101 program offers in-depth lessons with experts to get anyone up to speed on topics across the industry. In partnership with IREC, businesses could get training for new employees and on how to run an apprenticeship program



Developers: Solar Energy Industries Association (SEIA), Interstate Renewable Energy Council (IREC)



Impact:

- New business training
- Apprenticeship program build out
- New employee training



4) Facilitate heat pump water heater (HPWH) rebate program

Build on Bozeman and Missoula's Success, Tailor it for Great Falls trade area

Key Steps:

1. Discuss learnings with Missoula and Bozeman contacts
2. Engage and establish a network of interested companies and contractors to build out program
3. Negotiate rebate amounts with MT DEQ and SEO and support existing water heater contractors to get trained

Example Annual Energy Bill Savings:

- \$250-370 per year

Who:

GFDA, MT DEQ, MT Office of Environmental Quality (SEO), Northwestern, City of GF, Cascade County

Example Programs:

- Bozeman
- Missoula

Case Study: Bozeman and Missoula Programs

MT Cities offer HPWH rebates and lead community + contractor engagement

Incentive Offerings

- HPWH rebate program pilot: coordinated across munis, \$500 per HPWH with additional \$75 for post-install survey; 40 installs completed/committed so far (all gas-to-HPWH)
- Developing a one-stop shop regional navigator for market rate & LMI incentives.

Community Engagement

- Major events: Electrify home tours, Climate and Clean Energy Expo, financing workshop
- Mailers, e-newsletter, social media, news ads, yard signs driving to ElectrifyMissoula.org
- Coordinated rebate outreach with both Climate Smart and NorthWestern

Contractor Engagement

- Partnered with local utility and plumbing distributor for training event and rebate outreach
- Partnered with SEO and 3 mfgs for ASHP event covering rebates & technology concerns
- Working with Blue Green Alliance on apprentice and pre-apprentice programs

Program Funding

- MT Department of Environmental Quality (SEO): \$87k awarded for rebates
- EPA Government to Government Program grant: \$1 million over three years

Reflections & Insights

- Community and contractor partnerships are essential.
- Focused on HPWHs to improve economics given climate and gas rates.
- Develop nuanced messaging for specific audiences.

Resources

- [HPWH Program One Pager](#)
- [HPWH Chronicle Ad](#)
- [Climate Smart Missoula Climate Expo](#)
- [Electrify Missoula webpage](#)

5) Facilitate and support retrofit programs

Maximize energy efficiencies and benefits of electrification of Great Falls region properties.

Key Steps:

- 1) Work with stakeholders to establish program goals and integrate key Components of a retrofit program:
 - Project identification & Energy audits
 - Simple application process
 - Energy-efficiency scope assessments
 - Supportive financing & incentives
 - Consumer protections
 - Viable Contractor network
- 2) Identify demonstration projects and connect projects to financing products
- 3) Identify companies or individuals in area to support; Build programming with partners to provide companies technical assistance, business coaching, demand creation strategies, and workshops
- 4) Support City or County in an educational campaign to drive up demand and promote program participation.

Who:

GFDA, MT DEQ (funding and workforce support), Montana State University (training), NorthWestern, Housing agencies, technical providers, Contractors, Financial institutions

Example Programs:

- Mass CEC Building Electrification Transformation Accelerator (BETA)
- MA DOER LMI Decarb program, Utility based LMI incentives, City of Boston Retrofit Fund

Residential Retrofit Example

Case Study: Boston, MA



Project Detail: 20,000sq. ft. 20 unit Multi-family building will be retrofitted with new insulated exterior shell and outfitted with an all-electric mechanical system. This project is expected to reduce its energy use by 70%. With roof top solar, this project will reach Net Zero energy operations



Developers: Allston Brighton CDC, Onion Flats Architecture, Haycon Construction



Funding Stack

61%	Base Financing
4 %	Utility incentive
10 %	City Green retrofit fund
20 %	State LMI decarb fund
1 %	ITC
4 %	IRA rebates (expected)



Commercial Retrofit Program Example

Case Study: Mass CEC BETA



Project Detail: Pilot initiative that seeks to surface and prove out the technical, implementation, and financial models for retrofits in commercial buildings sector.



Developers: Mass CEC, RMI

Impact:



- The pilot will **provide no cost, in-depth building audits to support commercial building owners** in planning electrification and decarbonization retrofits.
- Custom plans will be utilized to create a robust set of market resources that support pathways towards full commercial building electrification.



6) Support or provide gap funding for net zero development in rural development

With a demand for 650 homes per year, we need to build safe, resilient housing now.

Key Steps:

1. Identify **potential rural communities or school districts where new or planned developments will be happening** in the next 10 years.
2. Collaborate with lenders and state agencies to create a financial support structure that **bridges gaps in funding** for these projects so they can meet net zero goals.
3. **Leverage existing funding streams** from federal programs like USDA's Rural Development initiatives.
4. Offer tax breaks, grants, or low-interest loans to developers who commit to net zero construction.

Who:

GFDA, MT DEQ, USDA Rural Development, and Clearwater Credit Union, Cascade County

Example Programs:

- USDA Rural Energy for America Program (REAP) for net zero energy development in rural areas

High performance buildings meet this town's energy savings goals.

Case Study: Greensburg, Kansas



Project Detail: On May 4, 2007, a massive tornado destroyed or severely damaged 95% of Greensburg. City and community leaders rebuilt the town as a model sustainable community.



Developers: Greensburg, DOE, NREL, local building owners



Impact:

- Thirteen Greensburg buildings are saving a **combined total of \$200,000 in energy costs** per year.
- Some buildings, such as the Arts Center, **generate up to 44% of their energy on-site** using renewable resources.
- The town's effort in green rebuilding **serves as a replicable model** for other communities.



7) Support rooftop solar for schools, nonprofits, and public buildings

Capitalize on the opportunity to power schools with solar through direct pay.

Key Steps:

1. **Identify pilot schools and buildings:** Collaborate with local governments and school districts to determine which buildings would benefit most from solar installations.
2. **Apply for grants and funding:** Leverage state and federal grants like the Solar for Schools program or U.S. Department of Energy programs.
3. **Launch public-private partnerships:** Partner with local rooftop solar companies to offer discounted or free solar installations on public buildings.
4. **Monitor and report results:** Set up a monitoring program to track energy savings and sustainability benefits, sharing results with the community to encourage more adoption.

Who:

GFDA, MT DEQ, Montana Office of Public Instruction, local school districts, and NorthWestern Energy

Example Programs:

- Minnesota's Solar for Schools program
- Church example
- Direct pay to support solar for low income populations

Minnesota's Solar for Schools program is transforming K-12 schools by integrating renewable energy, reducing costs, and enhancing education.

Case Study: Minnesota Solar for Schools Program



Project Detail: Provides grants to K-12 schools to install rooftop solar panels.



Developers: Minnesota Department of Commerce Division of Energy Resources, school districts, local solar installers.



Impact:

- As of May 2024, **92 schools** have been awarded grants, with 47 more applications under review.
- Installed more than **23 MW of solar capacity** across **190 schools**, making Minnesota a top state for solar in
- Significant energy savings help schools cut costs while transitioning to clean energy, contributing to long-term sustainability and resilience goals.



Thanks to direct pay, nonprofits can now leverage clean energy tax credits for innovative solar projects that they previously could not afford.

Case Study: Church of the Holy Comforter, Vienna, VA



Project Detail: 176 kW solar panel canopy in the church's parking lot, along with rooftop solar panels.



Developers: Structural Solar (canopy structure), Ipsun Solar (solar panels), and Govan Builders (general contractor).

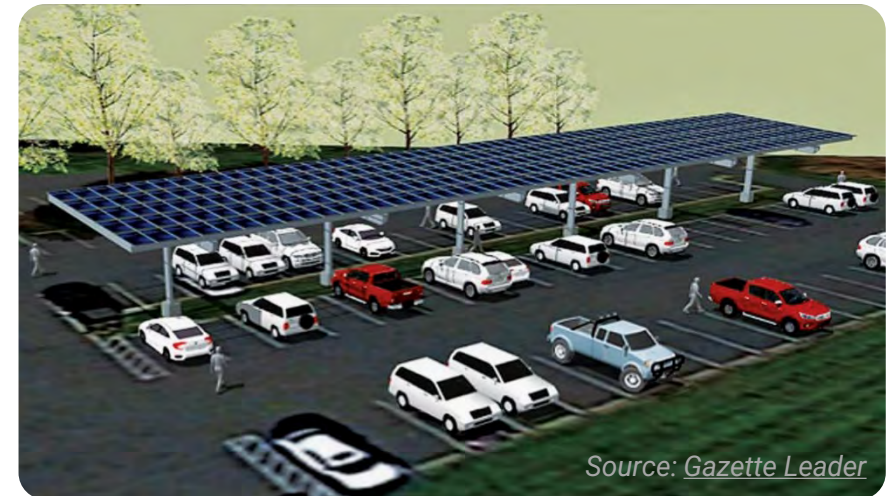


Impact:

- Providing shade for cars without sacrificing any parking spots.
- One of the largest solar panel project in Vienna, Virginia.
- Enabling the church to achieve its 100% carbon neutrality goal.

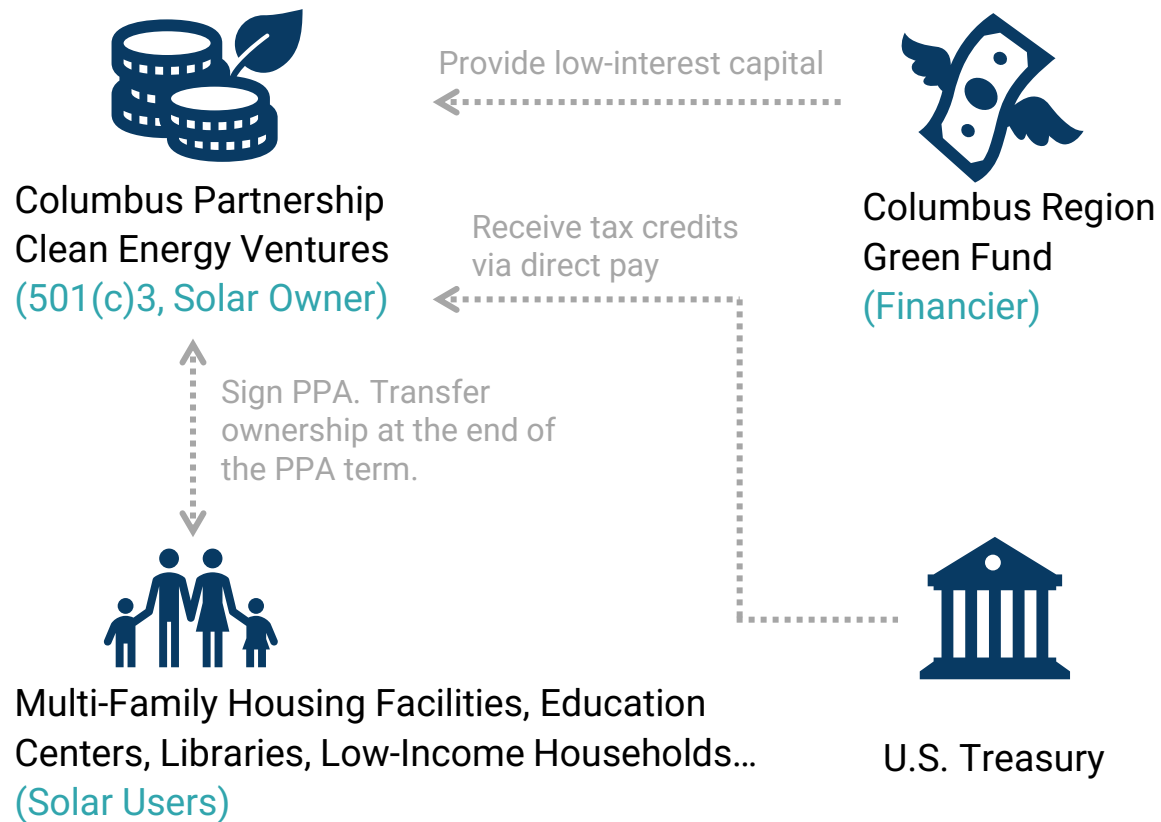
What does this mean for solar developers?

- Identify local nonprofits that have high energy bills or clean energy goals.
- Expand product portfolios to include innovative solar solutions, such as solar canopies.



Direct pay has also unlocked an emerging opportunities for nonprofits to steward solar access for low-income households and community facilities.

Case Study: Impact Solar Program in Columbus, OH



Impact:

- One of the first solar stewardship programs in the US leveraging direct pay.
- Deploying 40 MW of solar across central Ohio.
- Resulting in around \$130 million in energy savings.

What does this mean for solar developers?

- Collaborate with local community lenders: Work with green banks and community development financial institutions (CDFIs) to promote awareness of this solar ownership model.
- Team up with local roof repair nonprofits: Identify potential sites for solar projects.

8) Support Development of Low-Embodied Carbon Insulation Production Facility

Great Falls can capitalize on the growth of the low-carbon building materials market.

Key Steps:

1. **Engage with manufacturers already producing insulation** or those interested in transitioning to low-embodied carbon alternatives.
2. Help **insulation producers access state and federal R&D funding** for developing or improving low-carbon insulation products.
3. **Connect insulation companies with supply chain experts and financial institutions** to help scale their production capacity.
4. **Educate contractors and builders in the region** on the benefits of using low-carbon insulation in new builds and retrofits.

Who:

GFDA, Montana Manufacturing Extension Center (MMEC), local insulation producers, and industry associations, investors, existing industry actors like Ecocon.

Example Companies:

- Hempitecture
- Savick

Pioneering U.S.-Made Biobased Materials with Sustainable Manufacturing

Case Study: Jerome, Idaho – Hempitecture



Project Detail: 33,000 sq. ft. nonwoven manufacturing facility using biobased, carbon-capturing hemp fiber for sustainable products like HempWool® insulation.



Developers: Hempitecture (Manufacturer), IND Hemp (Raw Material Supplier), Iron Vista Development Group (Building Developer), Jerome 20/20 (Economic Development Partner)



Impact:

- **US made manufacturing:** Producing carbon-negative insulation and packaging with U.S.-grown hemp.
- **Regional Growth:** 25 to 50 jobs to manage automated facility; Strategic location for Rocky Mountain and national distribution.
- **Clean Energy:** Powered by hydro, solar, and wind energy via Idaho Power's Green Power Program.



Leading the Way in Low-Energy & Production Prefabricated Straw Construction

Case Study: Edmonton, Alberta — Savick



Project Detail: Savick produces prefabricated straw panels for low-energy, carbon-storing building solutions, using local straw and wood.



Developers: Savick, Local Straw Farmers



Impact:

- **Job Creation & Regional Growth:** 5 to 10 jobs created; Local production and sourcing support Western Canada's economy.
- **Carbon Storage & Cost Savings:** Straw panels lower construction costs by reducing energy usage but also sequester carbon.
- **Supply Chain Innovation for New Construction:** Leveraging local materials, Savick reduces transportation costs and supports rapid building of new homes.





Thank you!